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**DEPARTMENT OF HEALTH & ENVIRONMENT**  
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**MEMORANDUM**

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**TO:** File 1.1, Forbes AFB

**THROUGH:** Randy Carlson

**FROM:** Dan Gravatt

**DATE:** March 27, 2000

**SUBJECT:** Summary of chlorinated solvent detections in groundwater at Forbes AFB and survey of potential receptors

Site:	Forbes Field AFB
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This memorandum is intended to summarize the investigation for and detection of chlorinated solvents in groundwater due to DOD activities at the former Forbes Air Force Base, and to identify and evaluate potential human receptors for this contamination. The information summarized here is primarily taken from the Final Site Investigation Report (SI) for the site, completed by RUST Environmental for the US Army Corps of Engineers (USACE) in July of 1995. Additional information is taken from site-specific correspondence and duplicate samples taken by KDHE.

Analytical Summary

The only groundwater wells installed at Forbes AFB are located at the two landfills in the southern portion of the base (Figure 1). These were installed in September of 1994 for the SI to determine groundwater flow direction and any releases from the landfills to groundwater. While 12 borings were drilled, only 10 were converted to wells (9 true wells and one piezometer), and borings B9 and B11 were abandoned. Wells 1, 3, 4, and 7 were completed in shallow, unconsolidated or poorly consolidated materials, while wells 2, 5, 6, 8, 10, and the piezometer were completed in bedrock (Table 1). After development, all ten wells were sampled in November of 1994 for TCLP VOCs, TCLP SVOCs, TCLP PCBs/pesticides, and TAL metals, as well as several groundwater quality characteristics (Table 2). Three residential wells just outside the site perimeter were also sampled and analyzed for the same contaminants.

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Trichloroethylene (TCE) and vinyl chloride (VC) exceeded their federal maximum contaminant levels (MCLs) and RSK values in wells OW-2 and OW-3, respectively, while antimony exceeded its RSK in wells OW-6 and OW-8. Nitrate and sulfate exceeded drinking water standards in PW-1, the Render well. The groundwater flow direction was found to be generally east, toward Lynn Creek and the town of Berryton (Figure 2). Based on these results, the landfills were found to be sources for groundwater contamination, and USACE contracted with BRAL Environmental in 1999 (as part of SmART Task Order 001, Forbes Field Airport) to perform long-term monitoring of these wells.

After the three residential wells were sampled by RUST in 1994, KDHE resampled the Render and Kinder wells (PW-1 and PW-3) for VOCs and metals (Attachment 1) in 1995. Analysis of these samples showed no detections of VOCs and no detections of metals in excess of MCLs.

In 1996, KDHE resampled wells OW-2 and OW-3, identified in the SI as being the most contaminated, for VOCs. TCE was again detected in OW-2, and VC was again detected in OW-3 (Attachment 2), at concentrations less than those in the SI. VC still exceeded its MCL in OW-3, though.

Results of the first quarterly sampling event for the landfill monitoring wells in September, 1999 were received by KDHE from USACE in February of 2000 (SmART Task Order 001: Forbes Field Airport, Quarterly Landfill Groundwater Monitoring Report #1, October, 1999). USACE's contract called for sampling a representative subset of the landfill wells, and wells OW-1, -2, -4, -5, -6, and -10 were selected and analyzed for VOCs, SVOCs, total and dissolved metals, total petroleum hydrocarbons (TPH), and several groundwater quality parameters.

Water level measurements indicated that groundwater flow directions were similar to those found in the SI. Low levels of phthalates were detected in two wells. VC was detected in excess of its MCL in OW-1 and OW-6, and TCE was detected above its MCL in OW-2 and below its MCL in OW-6. Benzene near its MCL and several chlorinated solvents below their MCLs were also detected in OW-1.

A second round of landfill well sampling occurred in February, 2000, and the results are pending.

### Other Potential Sources of Contamination

The inventory project report (INPR) for this site, completed in 1991, identified only the underground storage tanks and the two landfills as potential DOD projects. The SI workplan (1993) contains a conceptual site model which identifies the landfills as the only primary source of contamination at the site. However, the workplan defines the investigation of six transformers, three paint/grease traps, and three oil drain pits in addition to the two landfills.

It is understood that, as an active army airfield, and later as an Air Force base, the site contained all facilities necessary to maintain and repair aircraft and other support equipment. These facilities no doubt employed a number of solvents, paints, oils and lubricants, and other hazardous substances which could have been spilled or otherwise released to the ground and migrated to groundwater. These facilities have not been identified or investigated by USACE. Since most of the base has been used subsequent to DOD ownership by the Metropolitan Topeka Airport Authority (MTAA) and the businesses leasing land or buildings from MTAA, there may be some question as to DOD's responsibility for any potential contamination. Nevertheless, soil and/or groundwater contamination attributable to DOD maintenance activities at the site may be present and should be investigated.

### Receptor Survey

Using the Kansas Geological Survey's water well database, water wells within 2 miles of the landfills were identified. Table 3 presents a summary of the wells found, and Figure 3 shows the locations of these wells relative to Forbes AFB and the two landfills. A total of 22 domestic water wells were located within 2 miles of the landfills, and many of these were within one-half mile or less of the north landfill. Note that the two wells in T 13 S, R 16 E, Section 15 are not shown on the map, as they lie just east of the map's eastern boundary.

The town of Berryton is approximately one-half mile due east of the south landfill, on the east side of Lynn Creek. The town gets its water primarily from Douglas County Rural Water District No. 3, but at times of high demand, water may also be taken from the City of Topeka's water system by RWD No. 3. As a result, the general population of Berryton are not expected to be receptors for any groundwater contamination originating from Forbes AFB.

### Recommendations

The substantial number of private, domestic wells within one-half mile of the north landfill is cause for concern. As described above, VOCs in excess of their MCLs were detected in monitoring wells on the eastern perimeter of both landfills, posing a potential threat to numerous domestic wells. KDHE should plan to sample some of these threatened wells periodically for VOCs and perhaps also metals and SVOCs.

KDHE should also work with USACE and MTAA to develop some type of site-wide groundwater sampling for Forbes Field, concentrating on former DOD maintenance areas.